

Toyota-style management drives Virginia Mason

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Perched on "Pill Hill" in downtown Seattle a few blocks from Puget Sound, the pavilions of Virginia Mason Medical Center look about as Asian as your nearest urban office block.

Even the term pavilion, which could denote an ornate pasha's tent or a warlord's silken banner, is here used only in the architectural sense: to signify an outbuilding connected to a central structure, in this case to a 336-bed, 17-story acute-care hospital.

Inside the complex, which is operated by a 400-physician multispecialty group that also maintains a network of clinics throughout western Washington, the decor is handsome but in no way recognizably "Asian." Nor are the faces of the patients and 5,000 employees crisscrossing the lobbies and corridors noticeably--certainly not predominantly--Asian.

Why, then, are exotic words like kaizen, kanban, jidoka, muda, and heijunka part of the everyday vocabulary around here? Why do Japanese syllables fall so trippingly off the tongues of clinicians and staff with such un-Asian names as Kaplan, Otero, Pittenger, Diaz, King and Creger?

Simple, really. It's because Virginia Mason Medical Center is busily transforming itself into a health care version of the Toyota Motor Corporation

In search of 'perfection'

To be sure, Virginia Mason's leaders are fully aware that the mission of preventing and treating people's ills does not correlate directly with assembling autos and trucks. But running a business is running a business: When you get right down to it, the key is eliminating muda--the Japanese word for "waste." And nobody does that better than Toyota.

Building on a rigorously schematized yet internally flexible set of operating principles grounded in a 1902 invention by founder Sakichi Toyoda--an automated loom that would shut itself down the instant a single thread snapped--the Japanese enterprise has grown from a small textile factory to the most profitable automobile manufacturer in the world. By 2007, it will also become the world's largest.

What is now universally admired as the Toyota Production System is an intricately woven web of policies and practices with two main strands:

1. Jidoka--equipping every machine and empowering every worker to halt the production process at the first sign of a glitch or an imperfection
2. "Just-in-time" (JIT) work sequencing

The objective is to whittle inputs and outputs at every stage to no more than what is needed, when it's needed, where it's needed and only in the amount needed.

The point of all this is to squeeze out muda. The goal is to eradicate it all, every kind and every last drop. That means constantly testing and refining processes so that costly mistakes don't happen, so that people interact at peak efficiency--skill, pride and disciplined autonomy feeding their energy--and so that the final product, whether a car or a pickup truck or for that matter a laboratory test or a coronary artery bypass graft, is flawless.

Flawless. The target isn't 96.5-percent perfection (the current high estimate of hospital performance as measured by medical errors suffered by patients) or even 99.9-percent perfection (which, in the airline industry, would work out to two fatal jumbo jet crashes every week). The Toyota Production System aims for nothing less than 100-percent perfection.

5 principles of success

Toyota pursues its Platonic ideal through a commitment to kaizen. That word is translated and widely if unevenly embraced in the United States as "continuous improvement." Kaizen in the Toyota management system rests on a lattice of principles, techniques and tools. Some of them are:

- * Standardized work -- every step in every task is defined on the basis of best practice and must be performed according to a rigid script (which is immediately modified if the plotline, not the actor, proves to be the source of a problem)
- * Takt time -- careful calculation of the rate at which a task must be completed in order to meet demand; the customer's pull, that is, sets the pace, not the producer's ability to push it (takt is the German word for the baton with which an orchestra conductor establishes the musical beat; it came into use when Japan and Germany were allies in World War II)
- * 5S workplace organization -- every workspace must be kept scrupulously neat, clean, arranged for ideal efficiency and cleared of all furnishings or equipment unnecessary to the tasks to be performed (the 5 Ss are the initial consonants of the Japanese words for these four concepts, plus shitsuke, or self-discipline)
- * Heijunka -- figuring out how to average uneven customer demand over time so as to create a predictable and level process flow
- * Kanban and andon -- signaling tools like information cards and status boards that visually display what's needed to keep a process moving and how well it's progressing.

Continuous improvement, of course--often with the word "quality" thrown in for good measure--is a commitment that has long since been espoused by American health care organizations. Virginia Mason is no exception.

The focus of CI, or CQI, however, is long-term--an accretion of incremental changes. Susan Creger, RN, a former operating room nurse who now finds herself managing Virginia Mason's version of the Toyota Production System, shudders at the old days of conventional CI. She dismisses it as "death by meeting."

But Toyota puts as much emphasis on quick-and-dirty results as on slow-but-steady upticks. Catch-phrases like "falling forward fast" and maxims like "It's better to be 50 percent right today

than 100 percent right some time in the future" encapsulate a readiness to look around and then make a leap of faith.

So another important term in the Toyota playbook is kaikaku--an improvement "blitz." It can take the form of a "3P" project (for Production Preparation Process), which involves a series of multidisciplinary meetings several days a week within a short time period to propose and test options for the redesign of something as complicated and capital intensive as a service line, a high-tech procedure or a facility. (It's a "greenfield" initiative if starting from scratch, notes Creger, "brownfield" otherwise.) More abbreviated and intensive Rapid Process Improvement Workshops, RPIWs, are convened in specific units when local snags need to be rooted out.

Toyota has been happy to share its unwritten operating handbook with others, even its rivals. Hundreds of participants from companies across the industrial spectrum, as well as government agencies and universities, have received training or attended workshops in the United States or in Japan under Toyota's tutelage.

Health care systems have been slow to recognize the potential applications of methods refined on industrial shop floors to their warm and fuzzy, people-centric world of birthing centers, ERs, ORs, ICUs, laboratories, kitchens, laundries and billing offices. All of which, of course, are often in reality cold, chaotic, machine-centric places rife with miscommunication and invisible to the clinicians and patients whose lives they can affect so acutely.

But things are changing. At least a dozen health care systems are today at various stages of implementation of Toyota's methodology--often rendered in English as "lean."

Virginia Mason has been the pacesetter. In fact, the Harvard Business School, which in 1999 profiled the Toyota Production System as one of the case studies that are the backbone of its curriculum for future corporate leaders, this year introduced a new case study detailing the structure and achievements of a remarkable health care adaptation. It's called "The Virginia Mason Production System."

Taking flight

On a plane ride home to Seattle in 2001, J. Michael Rona, president of Virginia Mason Medical Center, struck up a conversation with the man seated beside him--John Black, then director of lean manufacturing at The Boeing Company.

Black is an apostle of kaizen who had led more than 800 Boeing managers on missions to Japan to study at the feet of the just-in-time masters at the Shingijutsu Company, the leading international consultancy on the Toyota Production System. The lean manufacturing principles Black preached at Boeing had been thoroughly absorbed, with dramatic results.

By the time a rapt Rona stepped off that plane, he was convinced his organization needed a dose of the same tonic.

"We met with John," recalls Gary Kaplan, MD, Virginia Mason's chairman and CEO, "and it became clear to us that the Toyota Production System was the premier management system in the world. So we went to school."

Guided by Black, who now runs his own international management consulting practice in affiliation with Shingijutsu and is Virginia Mason's ongoing mentor, the preliminary boning up, notes Kaplan, "culminated in our saying to the executive leadership team, 'If you want to be a senior executive [in this organization], you've got to come with us to Japan.'"

And so in June 2002, the occupants of the entire top layer of the Virginia Mason organization chart, some 30 in number, dutifully trooped off for a 13-day immersion in TPS praxis in its birthplace. (Among the lessons they derived, observes Kaplan, was that "the institution didn't fall apart without us.")

Their experience included hands-on work in assembly lines operating under jidoka rules. They gained insight into the rationale for strict prescription of how tasks are to be performed. As explained by Harvard Business School professors Steven Spear and H. Kent Bowen, the "calling for people to do their work as a highly specified sequence of steps ... tests the two hypotheses implicit in its design: first, that the person doing the activity is capable of performing it correctly and, second, that performing the activity [in this way] actually creates the expected outcome." (1)

Every worker, in other words, becomes a scientist, trained to analyze how things are currently being done, to throw the switch and go ask for advice if anything seems to be amiss and to step forward with ideas for how the process might be simplified or made more reliable. (According to Rosemary King, RN, another frontline nurse reassigned to manage the Virginia Mason Kaizen Promotion Office, Toyota employees proposed some 570,000 improvements last year alone.)

When they returned from Japan, the organization's leaders were kaizen converts, or at least well on their way. Kaplan has led five subsequent trips, each, he notes, with the same effect. Certainly Rona and Kaplan were believers.

Two months later, the "Virginia Mason Production System" was officially the bedrock of the organization's strategic plan.

'The patient is God'

Trim, personable and dapper, a subdued necktie firmly knotted under his crisp white clinician's coat, Henry Otero, MD, leads visitors through the sparkling new cancer center, where he's the chief of medical oncology.

Two years ago, most of this second floor of Virginia Mason's Buck Pavilion was occupied by the dermatology department, he explains. Why it no longer is testifies to the power of the VMPS.

It began, Otero says, with a proposal to fit out a glossy new home for outpatient cancer services on the ninth floor of the companion Lindeman Pavilion, a vacant, airy space with wrap-around views of the Seattle skyline. The goal was to consolidate many of the outpatient cancer care components scattered throughout various floors of the hospital and the Buck Pavilion. It was an exciting opportunity--especially for the doctors, who could look forward to those vistas from their office windows.

The 3P planning team, which included cancer patients and an architect as well as Otero and representative staffers, eagerly sifted designs to achieve ideal internal workflow and

convenience. A final layout was selected, and then a lingering unease began to surface among the 3P participants.

The Virginia Mason Production System is all about reducing waste--including any unnecessary burdens on patients. "The patient is God," the visiting American executives had been lectured over and over by their mentor in Japan, Chihiro Nakao, of Shingijutsu International. That was Rule One at Virginia Mason, too.

But if you thought about it, Otero and his colleagues realized in hindsight, the new cancer center location high up in Lindeman Pavilion would only redirect, not significantly shorten, cancer patients' exhausting treks around the campus on appointment days.

And so, in an unprecedented turnabout, they belatedly announced that they would have to reject the attractive site "if we're really serious about our commitment to patients and to 'lean,'" says Otero.

Since radiation oncology with its heavy equipment was rooted in the basement of the Buck Pavilion, and labs and pharmacy were on its upper levels, efficiency and concern for patients recommended lodging the cancer center in the same building. The only problem, they acknowledged, was that Buck had no available space.

Their twelfth-hour change of heart was costly for the organization, he admits, at least in the short run. And resolution of the dilemma it presented required lots of imagination, diplomacy and good will. But in the end, fealty to VMPS precepts produced a major win-win for the system and its patients.

Dermatology, whose services are largely self-contained, agreed to relocate into the expansive Lindeman digs with which, Otero says, they are delighted. And the cancer center, its design rendered even tighter and its capabilities expanded by another round of 3P kaikaku, nestled into the second floor of Buck.

Having filled in the back-story, Otero proudly points out the many anti-muda features of this unit. Notice, he says, that in this iteration it is no longer the doctors' offices that line the windowed outer walls. Patient rooms, in which waiting and worrying and tedious bouts of chemotherapy will be assuaged by light and views, get the windows. Doctors, nurses, social workers and support staff occupy the center space.

Otero's own compact, tidy corner office, like his colleagues', has two doors. One opens on the aisle, putting him a stride or two away from the patient rooms opposite. The other opens into the walled central island, where he can nip into his nurse's adjacent office for a word, or walk a few more steps to the neighboring desk of his intake counselor (open and facing the aisle).

He can visit the interior banks of file cabinets, then retrace his steps or exit through an open passage into the aisle, or continue along the interior route to consult with other staff members. They, of course, can do the same.

"It's all based on the concept of the U-shaped cell," Otero notes. He traces with index finger on upturned palm the short, curved paths this layout--a staple of lean design--facilitates.

"At first some of the doctors didn't like it," he admits. "They couldn't just retreat into their offices and shut the door. 'I get all these people coming in to ask me questions,' they complained. 'Well, if you're getting a lot of questions,' we said, 'that must mean there a lot of things that aren't clear--potential problems. They need answers. Don't you think?'"

Mastering tasks

Kim Pittenger, MD, and Shirl Diaz happily credit another application of U-shaped cell design--implemented in support of standardized work sequencing for physicians--for big jumps in revenues, margins, quality of care indicators, job satisfaction and patient satisfaction ratings at Virginia Mason's satellite primary care clinic in Kirkland, Washington. Pittenger is head of its family practice section and Diaz is clinic director.

In this instance, the U is an arrangement of wall cubbies outside each physician's office door. The layout was developed through the RPIW process to facilitate a step-by-step pattern of tasks each doctor is supposed to execute immediately upon emerging from a patient visit. They are:

- * Fill out a charge slip for the visit
- * Document the visit
- * Respond to at least one routine e-mail message from the medical assistants who answer the clinic's telephones--the role of "advice nurse" has been eliminated by linking them directly to the doctors)
- * Answer at least one urgent message
- * Read and reply to at least one piece of hard-copy mail
- * Fill out at least one result report
- * See the next patient

This order of business captures critical financial and clinical information while it's fresh in mind rather than in blurry retrospect at the end of a wearing day. Communication loops are closed promptly. The hard-and-fast sequencing helps seal the cracks.

Coupled with a simplified clinic workflow--patients can now get same-day appointments, the volume of calls has been reduced by a third while visits are up 10 percent--this provider script has helped boost gross revenues on the family practice side by more than \$650,000 since 2003. That has turned a \$300,000 loss two years ago into a \$112,000 gain.

Meanwhile, say Pittenger and Diaz, the clinic's internists, who initially dragged their feet at the indignity of having their moves choreographed, have posted far less dramatic gains. But since productivity is a factor when individual physicians' salaries are being allotted (annual revenue per family doctor is now \$36,000 higher than for internists despite having started out \$20,000 lower in 2003), the internists too are earnestly dancing to the VMPS piper.

Not everyone, of course, has bought into the new order. Some of them are no longer with the organization. Others, "once they touch it," says Kaplan, become flip-floppers; he cites the example of a curmudgeonly "opinion leader" who first scorned his invitation to join one of the semiannual kaizen pilgrimages to Japan ("over my dead body," Kaplan remembers the physician scoffing), then after watching colleagues translate their newfound knowledge into effective action, sheepishly asked if he might be included on the next trip. (He was, and has become a VMPS cheerleader, says Kaplan.)

In any case, Toyota DNA has infused Virginia Mason's bone marrow. Every senior manager from the assistant director level up is required to earn a VMPS Workshop Leader qualification (by attending seven daylong sessions over six months). Kaizen fellowships for deeper study of lean doctrine are awarded to those deemed potential future leaders. Otero is a grantee for 2006.

A Patient Safety Alert system has been in place for the past three years. Every employee is authorized--indeed counseled--to blow the whistle if he or she spots a safety breach or a condition that could lead to an error.

Red alerts bring procedures to a screeching halt until the danger is addressed. Orange and yellow alerts signal less pressing but nonetheless serious problems. Department executives and managers, including the vice president, are committed to respond to an alert scene with dispatch--a "24/7 drop-and-run policy," Kaizen Promotion manager King calls it. *From August 2002 to November 2005, she reports, 1,620 alerts were sounded. *

More routine improvements are carried through a "Standard Work Alert System" and an "Everyday Lean Proposal System." The latter promises small monetary rewards to those whose suggestions for paring away day-to-day muda are implemented.

To alleviate fear that a laborsaving idea might result in the loss of one's own job (and at least \$1 million have been saved by eliminating surplus positions through attrition since the VMPS was launched two years ago, King reports), there is a no-layoff policy. Every casualty to efficiency is guaranteed a replacement job somewhere. One possibility is in King's Kaizen promotion office. It started with five employees, now has 19 and really should, she says, grow to 50 to suit an organization of Virginia Mason's size.

Indeed, though only in its infancy, the Virginia Mason Production System is already paying off enormously for the organization, King asserts. Through dozens of RPIWs and application of the full range of techniques in the kaizen quiver:

- * Staff have found ways to shorten the distances they have to walk by 34 miles and the distances supplies have to travel to get where needed by 70 miles.

- * Inventory costs have been slashed by 51 percent and lead times reduced by 708 days.

- * Productivity gains have freed up 77 FTE, a 44-percent reduction.

- * Defects have declined by 47 percent.

- * On top of that, 3P blitzes have resulted in cumulative savings of at least \$12 million budgeted for improvements like the cancer center.

In his office off the lobby of the Buck Pavilion, CEO Kaplan keeps five antique wooden shuttles on his desk. Each device--used to carry the woof thread through the warp on a loom--is a souvenir of one of his visits to Japan. They commemorate the genius of a system he has come to revere, the mechanism by which a small weaving factory turned itself into the world's premier automobile manufacturer.

"We've spent more than a million dollars" to launch the VMPS, Kaplan allows--quickly adding: "Probably the quote would be: 'Our investment on this will be greater than any investment we have ever made.'"

Trying to convert a smallish provincial U.S. health care system into a mini-Toyota Motor Corporation might seem a curious aspiration. But a lot of Virginia Mason's peers now share the same not-so-quirky vision. Kaplan was recently invited to the Mayo Clinic to describe what's happening in Seattle, and a Mayo delegation is scheduled for its own on-site visit, he says.

"I told them that if they want to adopt it," he grins, "they're welcome to call it the Virginia Mason Production System."

Whatever the rubric, whether the original Japanese terminology is retained or translated into English equivalents like 'lean' ("we call spaghetti 'spaghetti,' don't we?" King argues), the objective is the same.

"It turns out--what we've learned," summarizes Kaplan, "is that the best way to improve quality is to eliminate non-value-added variation. This is a way, a method for that. And it's working!"

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Reference

1. Spear, SJ and Bowen, HK. "Decoding the DNA of the Toyota Production System." Harvard Business Review, September-October 1999.

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